DESIGN INFRASTRUCTURE FOR LARGE ORGANIZATIONS

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Bachelor of Science (Architecture)
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Submitted to the Department of Architecture in partial fulfillment
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ABSTRACT

How may design address the conditions of change and creativity in today's workplace environment? Increasingly there is the recognition that in order to develop effective workplaces, the design not only needs to respond to functional requirements but also increase the role of the individual users and suppliers in the ongoing evolution of the office space. Expanding the level of participation in the design and decision-making process increases the level of complexity and requires the re-evaluation of existing design conventions. If the design team chooses to meaningfully engage in these matters, then issues such as the relationship between individual identity and organizational culture, coordination and distribution of resources, and consideration of perceptions and changing behaviors necessarily need to be addressed. The assessment and formulation of these issues generates the basis for this architectural investigation on a collaborative design process in the workplace.

The investigation begins by examining conventional design paradigms in order to articulate some of the limitations in the design process as currently practiced by architects and designers. In particular, design processes that clearly delineate the providers (manufacturers, designers, consultants) from the users (organizations and the employees) are seen as problematic due to the fact that the end users themselves are often excluded from important decision-making transactions. What is needed is an alternative design approach that can engage individual users to continuously shape their office needs and environments within parameters of a negotiated framework. Despite the added complexity, it is argued that this direction is critical in providing an ongoing and systematic process to accommodate for user interventions and design innovation in today's networked office.

Several design exercises serve to illustrate this alternative approach and its possible impact on the physical spaces in progressive office organizations. These exercises emphasize the visual aspects of communicating temporal relationships, behaviors and design processes. Specific scenarios are also investigated exploring new dynamics and their ability to affect the physical qualities of the design outcomes. By developing a more distributed and iterative approach, the thesis aims to create a new model of workplace design that can foster new interactions, innovation, effective evaluation and collaboration.

Thesis Supervisor: Peter Testa
Title: Associate Professor of Architecture

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INTRODUCTION: RAPID EVOLUTION IN WORKPLACE ENVIRONMENTS

The expansion of high technology industries in North America has contributed to a renewed interest in workplace design for large organizations. The rapid growth of these organizations has led to the development of new office facilities that enables the consolidation of multiple work groups and divisions within one physical location. In many instances, these organizations have relocated from downtown and urban settings to suburban areas with more land to facilitate for the construction of integrated and campus-like office complexes. However, many of these suburban locations lack the public and civic amenities that the employees of the organization typically value.

Increasingly, progressive organizations are recognizing the importance of attracting and retaining skilled labor in the technology industries. Today, corporations are investing in people and studying the criteria for what makes them more productive. Consequently, these organizations are seeking ways that the design of the workplace can support user satisfaction and performance. Many organizations are making significant investments to improve the quality of their office facilities with the application of design and technology.

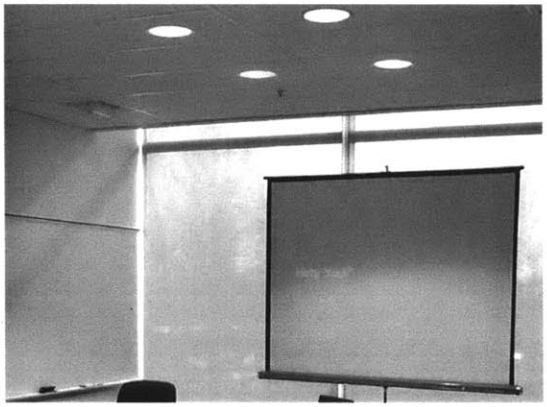
In many instances, technologies relating to the organization's core competencies have been implemented in the new workplace. Advances in monitoring systems, computer facilities management and network infrastructures have been introduced in many high technology office environments. Most of these systems provide an increased level of control between the management of the organization and the physical facilities.

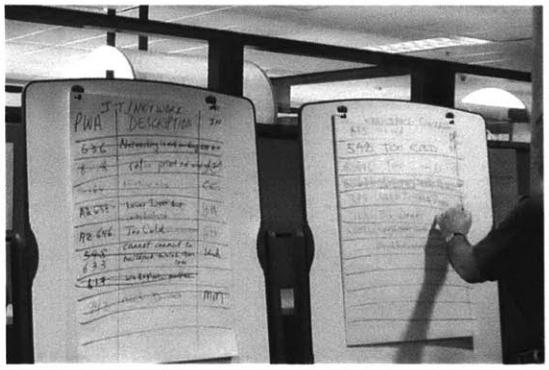
Given these new developments, how can design respond to the broader forces impacting the workplace? On the whole the design profession has neglected the rapid advancements that are taking place in the high technology workplace. Most architectural practices remain narrowly focused in the realm of aesthetics and the formal design of individual objects. The contemporary office is affected by not only architectural design but also by management processes, technological innovation and strategic decisions. In most cases the impact of larger forces on the physical design

of environments and objects has remained unexplored in architectural design. Examining the intersection between organizational forces and physical space may effectively improve the design of new or existing workplaces. For this to occur, however, specific issues need to be identified and situated in the context of the design process in order to articulate the areas where designers can rethink the design of high technology office environments.

Increasingly the challenge for designers of the workplace lies in understanding the implications of the organization's technological infrastructures. Technologies are enabling space planning and management systems to exchange with other workplace-related data such as personnel management information. The benefits of computer integration may result in the improvement in operational and time efficiencies but there is the concern that the increased use of computer assisted facilities management systems will create a tendency for further rationalization of space design and planning. This rationalization can be detrimental to the quality of the workplace environment if rules are imposed restricting many aspects of the workplace and reinforcing the standardization of components. One aspect that designers can impact in the area of computer integrated building systems is through exploiting the technologies and their insights for better design outcomes. Many of the computer aided facilities management tools, for example, have focused on representing tacit information of the organization. These tools have the possibility to not only facilitate for functional processes but also to create a relevant space of opportunities to actively promote design innovation within the organization.

One of the goals of the thesis is to examine the role of architectural design given the overlay of technologies in the workplace. The transformations taking place in informational and communicational aspects of the workplace provide the opportunity to rethink the existing approaches to office design and planning.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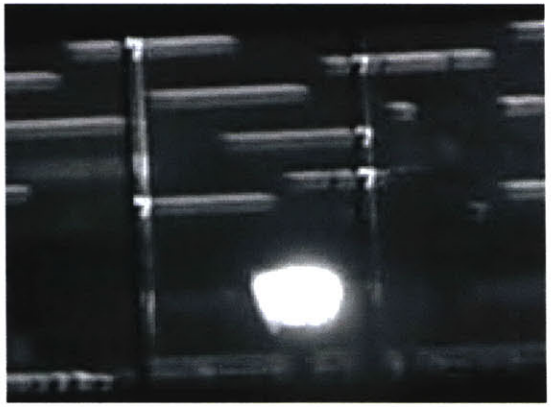
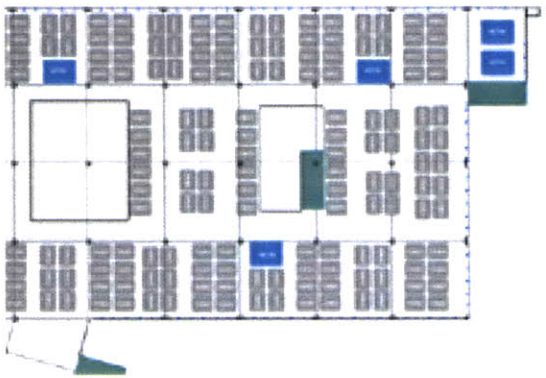
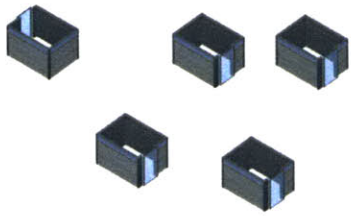
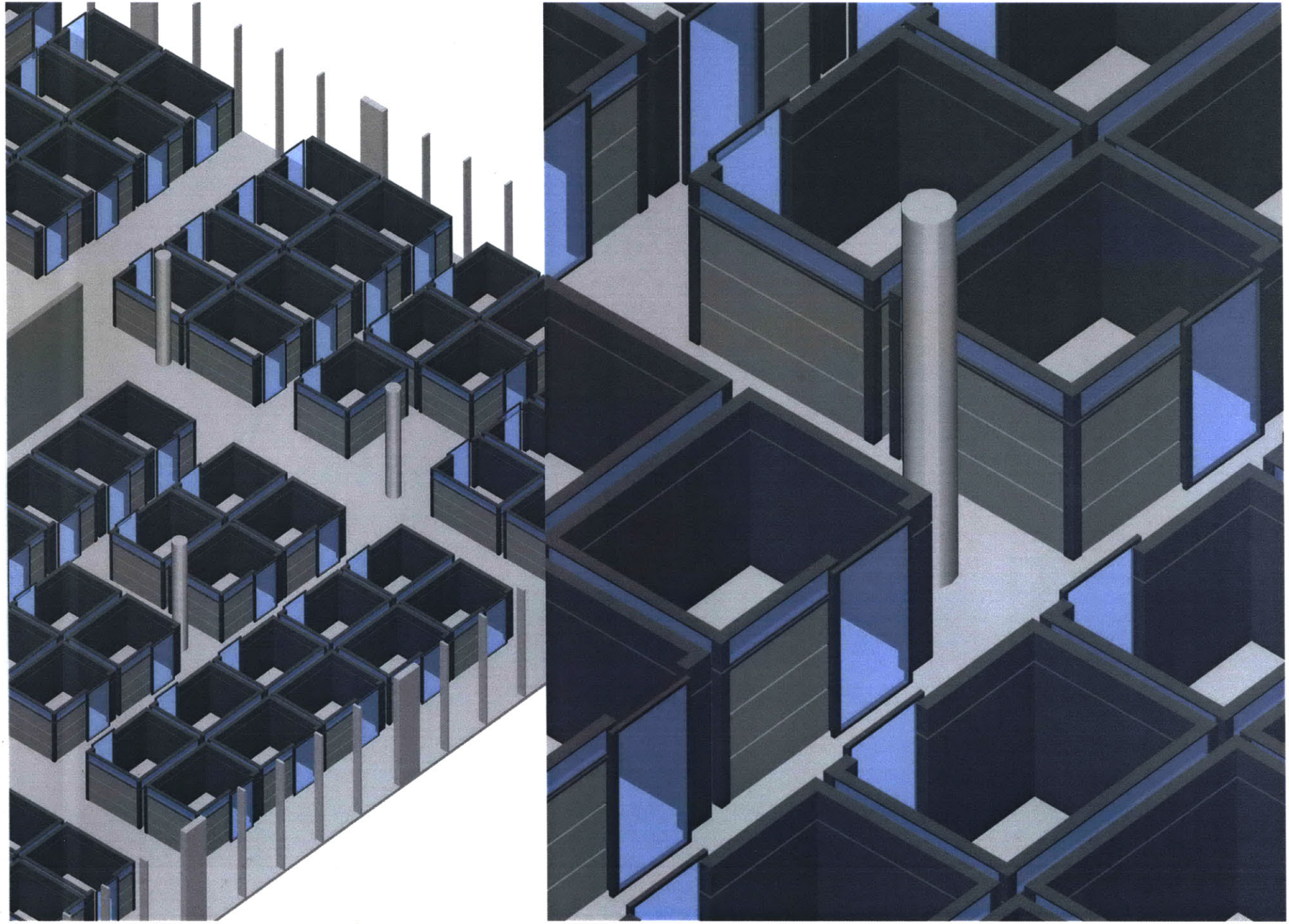




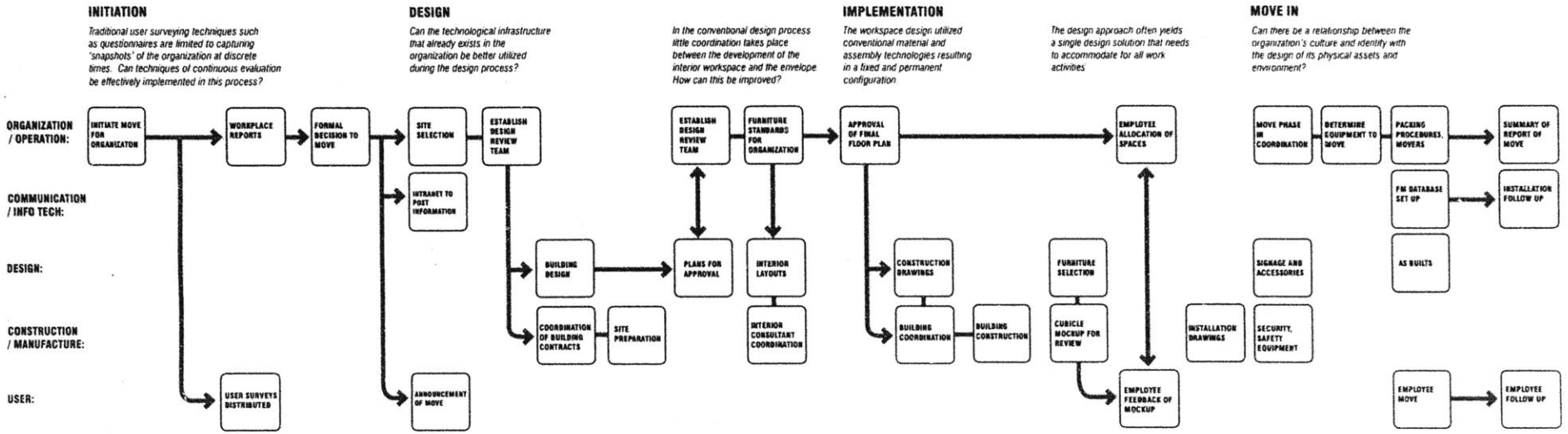




CUBICLE LAND: EXISTING OFFICE LAYOUTS

MAPPING THE MODEL OF WORKPLAN DESIGN: SOME EXISTING PRACTICES

This chart diagrams the participants and some of their roles in the design process. The conventional approach is characterized by a linear decision making process which allows for an efficient and rational for fast track schedules. How can some of the existing practices at different stages be augmented to improve the quality of design?



DESIGN AS AN ACTIVE AGENT IN THE WORKPLACE

The approach taken by this thesis investigation is one that seeks to understand the mechanisms of existing protocols and to operate within the constraints of the organization. This way an effective response can be developed to assist in charging and improving on some of the existing techniques already used in formulating the design.

In the design for new facilities for a progressive software development company, even after undertaking extensive user evaluation and developing mockups, the final outcome of the new workplace layout was a homogeneous design that was implemented uniformly throughout the office building. As a result, one configuration was applied to an area comprising of almost 400,000 square feet. While there were many issues that factored into the final design result, it seems that after investigation, the result had less to do with lack of motivation for a more innovative solution than with the mechanics of the design process itself. There was the thinking on the part of the designers, suppliers and the organization to work towards a better solution but the design resulted in the development of one workstation configuration that was limited in flexibility. Why was this the case?

ACTIVATING COMMUNICATION

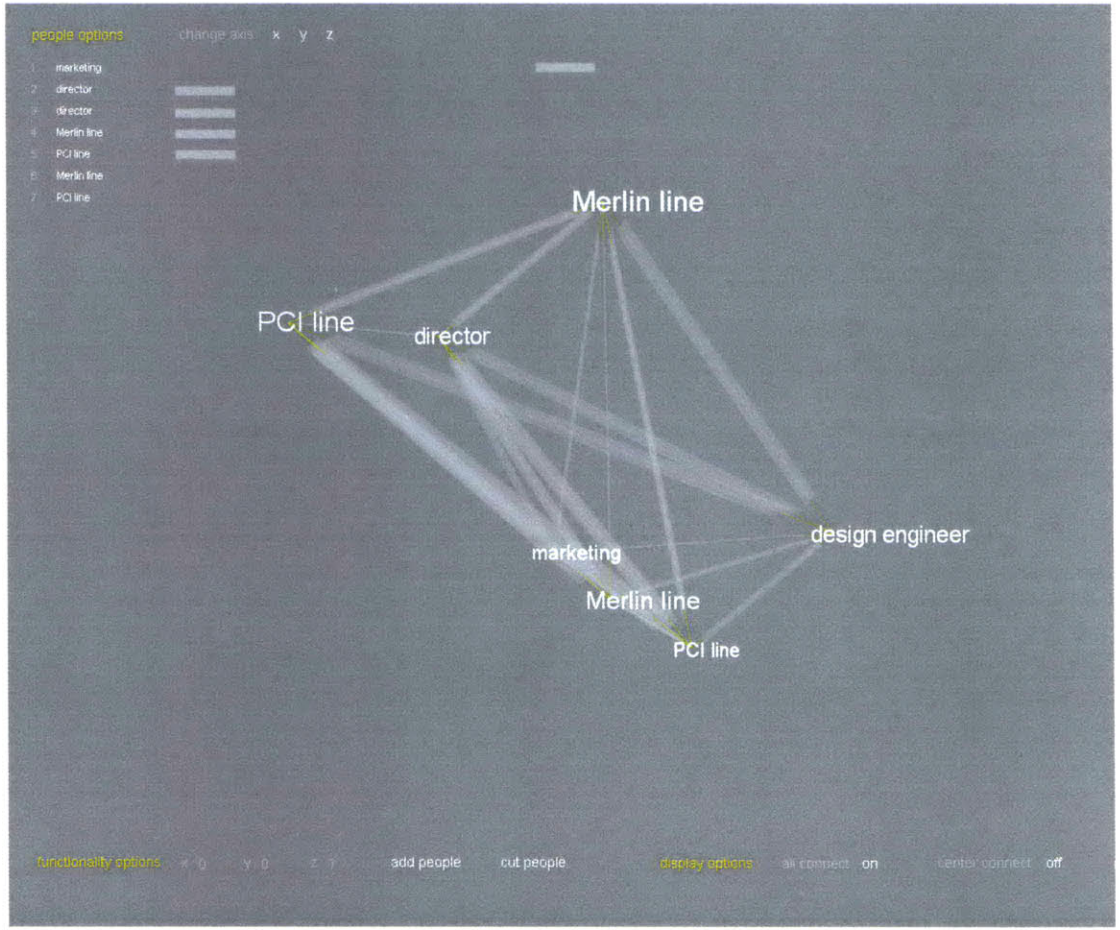
Traditional workplace evaluation techniques and linear models of office design contribute to some of the limitations in the design process. Many of the formal evaluation techniques emphasize strictly technical and empirical approaches and as a result leave little room to elaborate on the design process itself. These techniques often conclude with one understanding of the design requirements within a static frame and exclude the complexity and evolutionary nature of design. New approaches that rethink the workplace survey and establish interactive techniques are needed to allow users to provide feedback at multiple points in time. More qualitative approaches need to be made where user experience can be documented and recorded in a manner which traditional methods such as surveying and marketing-centered techniques cannot provide. For instance, often people interpret their workspaces and give it a meaning through the uses and rituals that

accompany the objects they use daily. This has a value in mapping people's relationships to the objects in order to provide a context in which the objects are used. These approaches help to underline the uses and interactions in forming experiences that unfold over a period of time.

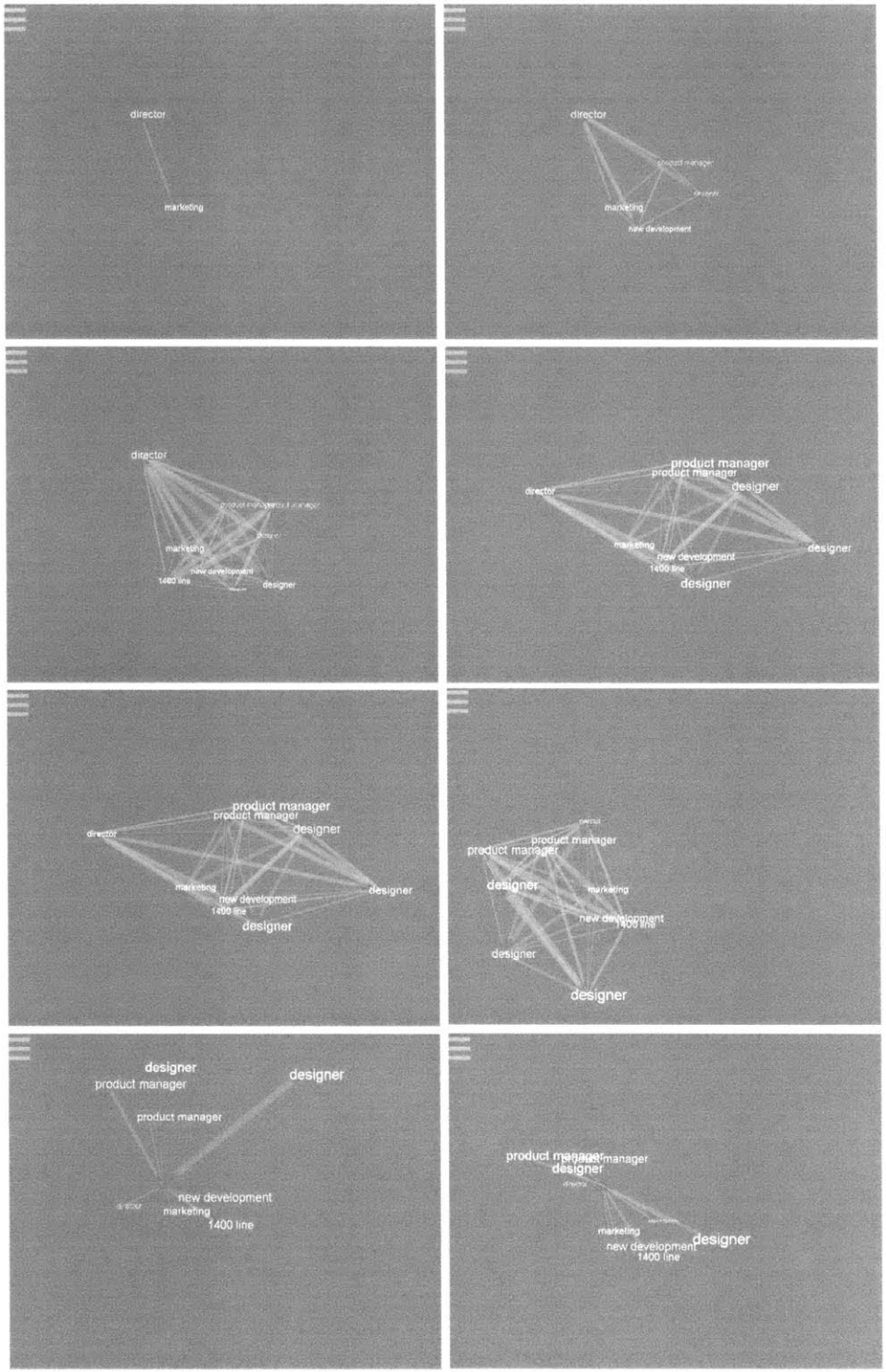
The traditional survey methods also lack two-way communications exchange. The acceptance of mundane work environments by employees is due in part from the lack of user engagement in the process of evaluating and designing the workplace. Many design outcomes for office layouts utilize a 'one-to-many' design model that presumes one type of user rather than different types with diverse demands and needs. Ideally, designers should be able to provide more than one solution for the multiple and heterogeneous workplace. In addition, during the life of the office building itself, the interior requirements will undergo constant change and adjustment. It can be said that the more the office seems to work, the more it will be in a perpetual state of revision. The design should therefore consider the development of a framework that can accommodate for architectural specificity as well as programmatic indeterminacy.

Designing for two-way communication is a complex problem, however, developments in digital media and computation are expanding the possibilities for visual representation and expression in communication. The role of communications media can be an important contributor to the process of designing an office space. Effective exchange of information between designers and users is seen as a crucial component to a successful design intervention. Successful communication in design, for instance, can result in the increase in scope and complexity of the design product as a result of the benefit from resources of multiple inputs and expertise. These communications tools could be embedded within existing informational infrastructures that are already in place for managing and maintaining building and physical assets within the organization. Typically the purpose for these systems, such as an electronic facilities request system, has been to increase the efficiency of response to practical issues such as mechanical and plumbing problems. While these systems effectively address purely pragmatic issues, their potential to serve as design tools is also significant. It is interesting to consider these systems as possible factors in impacting the design of environments and objects. Increasingly, designers working on offices should be responsible for developing strategies that mediate technological devices with the users of the space. Design

should be engaged in establishing relationships with tools and with the environments and workstations. The technology infrastructure can expand beyond its current functionalities that strictly emphasize on maximizing operational efficiencies.



In this design exercise, data visualizations were developed from information collected from the workplace strategy planning analysis. The concept of the visualization was to rethink the workplace survey and develop an easy to use and interactive tool that can be given to users to provide feedback not only at one point in time (for instance, during one consulting session between the researcher and client) but rather at an ongoing basis. Rankings were correlated and mapped in geometrical space to form simple 3 dimensional spatial diagrams.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Video is used not only for the purpose of documenting interviews and conversations but also as a reflective technique to explore the possibilities for visual and spatial expression.

ACTIVATING THE PHYSICAL SURFACE

Most work activities today involve the user interacting with a variety of horizontal and vertical surfaces. Low levels of differentiation however restrict many of the work surfaces in contemporary offices. In office design, materials and building components are often modular and arrive pre-formed as products to be installed on the site. As a result, the physical components are often overlooked in their contribution to the quality of the office environment. Experimenting with building materials and construction systems to discover and extract new qualities from seemingly prosaic elements may yield the construction of new and unanticipated programmatic and spatial configurations for the organization.

Looking at the physical environments of many existing office spaces today, one can sense the need to engage in developing more tactile qualities of the surfaces of work and communication. Recent developments in architecture offer new possibilities for utilizing materials that are both resilient to wear as well as possessing new properties. These new properties can directly and indirectly affect various work activities of the high technology organization. Research and fabrication of new material possibilities, and the invention of their expanded applications in design, can assist to produce programmable surfaces and even introduce unexpected forms of beauty within the office environment. This exploration can be seen as an exploration of the organizational culture excavation, where investigation can contribute to critical revision of the company and where new possibilities can be made.

One of the biggest concerns with existing design models is that at the level of the physical design, the results often remain rigid and impervious to change. The implementation of current design practices in workplaces restricts the opportunities to produce successful responses to the diverse needs of the contemporary workforce itself. We end up with offices that we see today because we are not able to integrate the constituents of office making and participating users and suppliers are not well integrated in existing models.

Ultimately, the programmatic requirements of the organization resulting from the workplace report should not be the primary basis for a definitive workplace design. Instead, the focus should be on developing a tactical proposal that can benefit from the accumulation of individual design interventions that occurring throughout the entire existence of the office (30+ years). This obviously must be achieved in both an efficient and innovative manner, while at the same time maintaining a relatively stable corporate and aesthetic identity of the organization. The underlying principle of ongoing indeterminacy as a basis of designing interventions allows shifts, modification to unforeseen events, strategy change to occur without creating chaotic environment. The following section attempts to identify aspects that are of significant importance to the development of a design model that emphasizes diversity.

DESIRED DESIGN OUTCOMES FOR THE NEW WORKPLACE

DESIGNING QUALITIES, NOT JUST FEATURES

It is not enough to design for 'features' or 'amenities' into the workspace. The approach of designing independent features without regard for the surrounding conditions misses the interconnected nature that exists in project work and the organization. We need to study the entire office landscape in order to design novel mechanisms for emerging interactions and to harvest collective thinking and knowledge. The design can become an instrument that can transform the decision-making process and include the user as part of a cooperative development environment. This approach can lead to the exploration of a design framework that is focused less on introducing new features and more on long term cooperative strategies.

CONTINUOUS DESIGN AND PROTOTYPING

In developing the design strategy, a concept of ongoing prototyping could be included to respond to the various design problems that take place in the office. This approach increases the possibilities of achieving results through the utilization of iterative prototype development. For instance, a greater number of opinions can be gathered and results in the greater number of ideas and options can be generated. The collective brainstorming results in the higher chance of discovering options that are novel and useful. In addition, ideas that might seem wild, unrelated or useless at first can function as springboards for future projects. By collecting a larger number of ideas and feedback, there are more possibilities to combine them. By looking for combinations, more novel and useful ideas are found. It also means that most ideas can be improved upon by modifying their attributes.

TECHNOLOGY FOR CUSTOMIZATION

Mass customization is a components approach for assembling individual products and services to meet the unique need of users but at a similar cost as a mass-produced product. Using information technology, users and designers can assemble products to meet specific and individual requirements. Over time, the products can be amended so that they continue to meet changing needs and continue to reinforce the relationships between the user and the designer. The

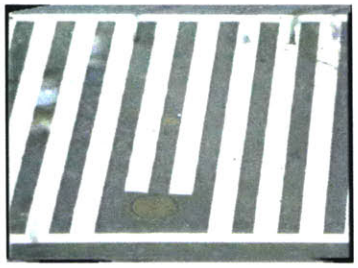
implementation of the mass customization approach requires a revising of the existing working contract between the organization, the designer and the manufacturers. There needs to be commitment by the organization to allow the designer to establish a long-term collaboration with the organization. Through this process certain innovations can be made from interplay between the various participants of the collaboration.

DECISION MAKING AND WORKPLACE ENVISIONING

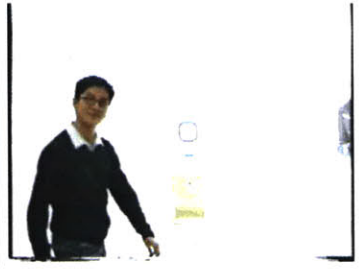
A framework needs to be established in order to facilitate for choice on the part of the user. The choices that people make should be seen as a result of how they organize their daily habits. This way, the decision-making can begin to be an object of reflection: why I do this in the space, why I like that about the office, how are others doing it as well? The framework could allow the user to change their work style to a larger degree without raising undue inconvenience.

New representations are needed to partially function as graphic tools to diagram as much as possible this design and decision-making processes. These representations need to effectively document the flow and exchanges of the ideas generated by a large number of participants but also visually analyze the process, show consensus and collective support or dissatisfaction with a design move. The development of the temporal aspect in the representations will allow for the construction of narratives while leaving visible the possibility of change.


[THE NEW EMPLOYEE]



"One of the most important aspects in the next generation office is designing for change. In many offices today, people are too busy to interact with each other because they might feel that it is not productive for their time or energy. In an increasingly mobile workplace however, commmunication is essential because there needs to be collaboration between people from different projects and expertise in order to innovate. How do we create a framework that allows for people to feel welcome as collaborator and innovator and not as a nuisance?"



TOWARDS A NEW SPATIAL PLANNING MODEL

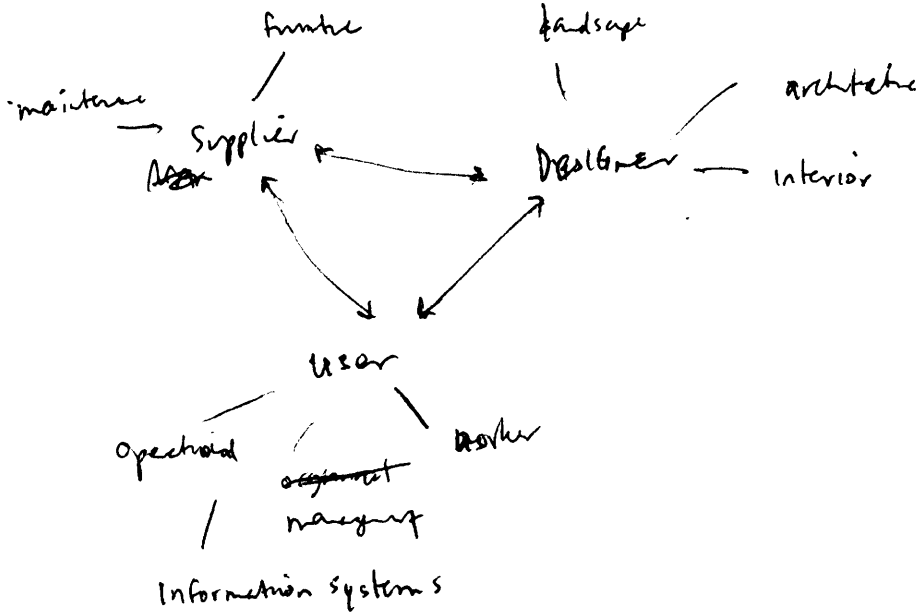
Does this mean that spatial planning is no longer relevant in the new workplace? Planning will be required for establishing guidelines and managing the larger relationships between the organization and the individual users. What is needed is a spatial planning model that augments the present one, which is based on dominantly functional connections and hierarchies. An infrastructure is required that makes use of the individual within the collective and is also capable of facilitating cultural as well as functional negotiations.

The idea of a more distributed spatial planning approach is closely related to the concept of the networked community of the organization. The new culture of work is ideally the culture of meaningful interactive communication between knowledge and place. While a explicit structure is still required, the design approach needs to transform from a rigid approach to a more flexible, negotiable set of tools utilizing various components that provide a blueprint for the various work group constituents throughout the work organization. The role of the architect in this networked design process is to become a facilitator directing the ongoing evolution of the office space. Designers should develop an active role in the development of time based and organic paradigms for facilitating the exchange of information related to issues about the physical environment of the workplace.

I BELIEVE THAT SOME RADICAL REFORMATION OF THE DESIGN PROCESS IS REQUIRED. MORE CUSTOMER/USER VOICE IS NEEDED. MOST CORPORATE EMPLOYEES ARE POORLY REPRESENTED AT THE DESIGN TABLE BY THEIR ORGANIZATIONS. AND EVEN IN CASES WHERE THEIR REPRESENTATION IS MORE ROBUST WHAT THEY END UP IS MUNDANE AND DRIVEN BY CONCERNS OTHER THAN THOSE OF THE USERS. SO, HOW DOES MORE CUSTOMER/USER VOICE BECOME PART OF THE DESIGN PROCESS?

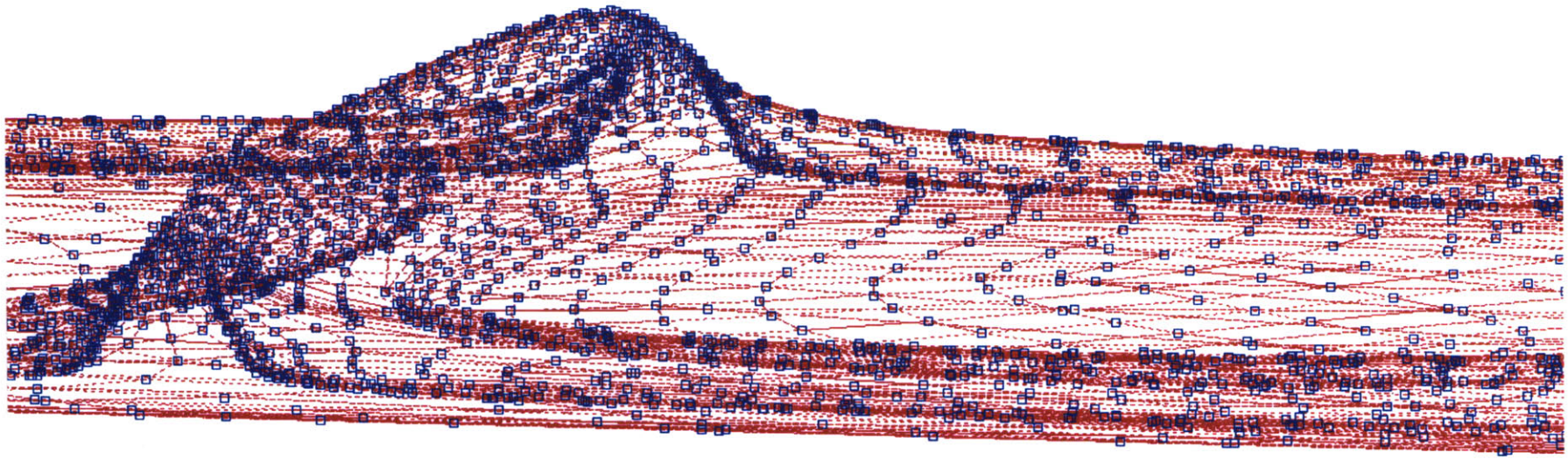
JIM LONG. ADVANCED RESEARCH HERMAN MILLER →

The challenge emerges: how can the designer orchestrate a dynamic coexistence of activities within the office landscape and generate new and unprecedented configurations? How can a systematic process be developed to provide for effective interface between the organization, the individuals and designers that conceived of the office design? An open-ended system is seen to provide for effective design under these conditions and to balance the homogenizing effect due to the overemphasis of business and efficiency factors. At the same time, the system can be less disruptive to productivity with its incremental development approach that yields appropriate designs while performing a higher number of design iterations. In terms of the design infrastructure, three components are proposed establishing the interdependent framework of design components:



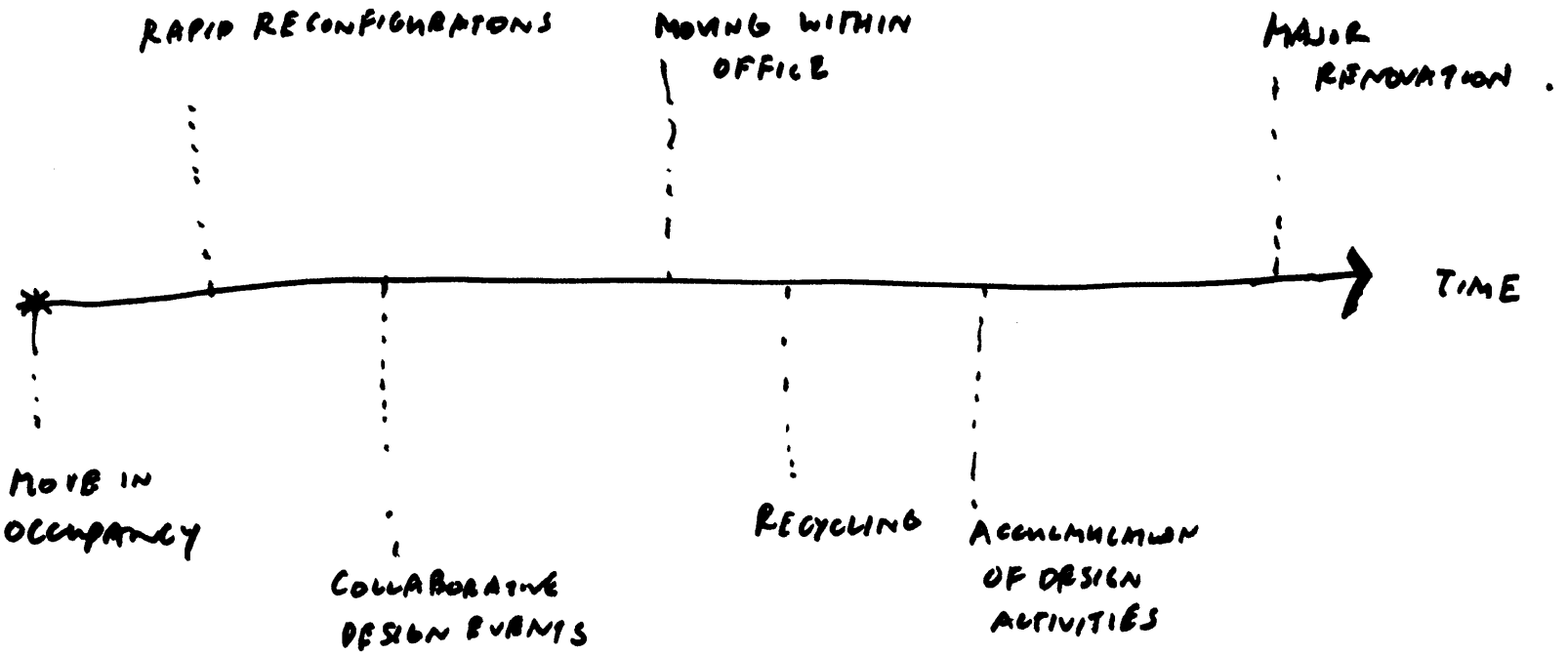
1) NETWORKED COMMUNITY TO LINK USERS AND PROVIDERS

A communications platform is developed to effectively map the exchanges of the ideas generated by a large number of participants and to visually analyze the process, show consensus and collective support or dissatisfaction with a design move. Given an initial spatial layout made by the designer, the office organization quickly evolves and improves as users exchange, transfer and negotiate with each other and with the designer when new demands arise. The communications tool can mediate information exchanges between individual workers involved in various design activities in the office as well as providing a common platform for articulating the process of design for the end users.



2) MATERIAL INNOVATIONS

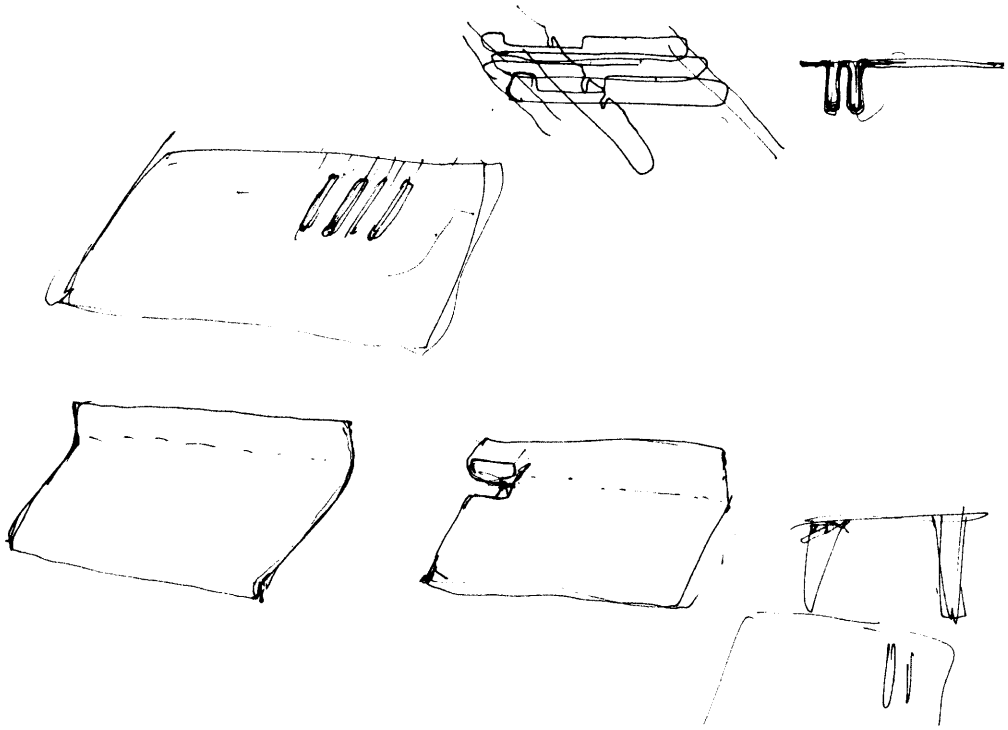
Material innovations are considered in the development of the physical design for the purpose of reducing both lead times and costs while maintaining design quality. New technologies are used to customize, extend, and modify the physical properties of materials, as well as endowing them with the power of change. Plastics have the most potential for design experimentation as various forms can be as transparent as glass, as flexible as fiber and as metallic as aluminum. Collaborations between the supplier and the designer will be established to develop faster turnaround in design and manufacturing process. The resulting designs will also consider faster delivery techniques and environmental issues such as recyclability.

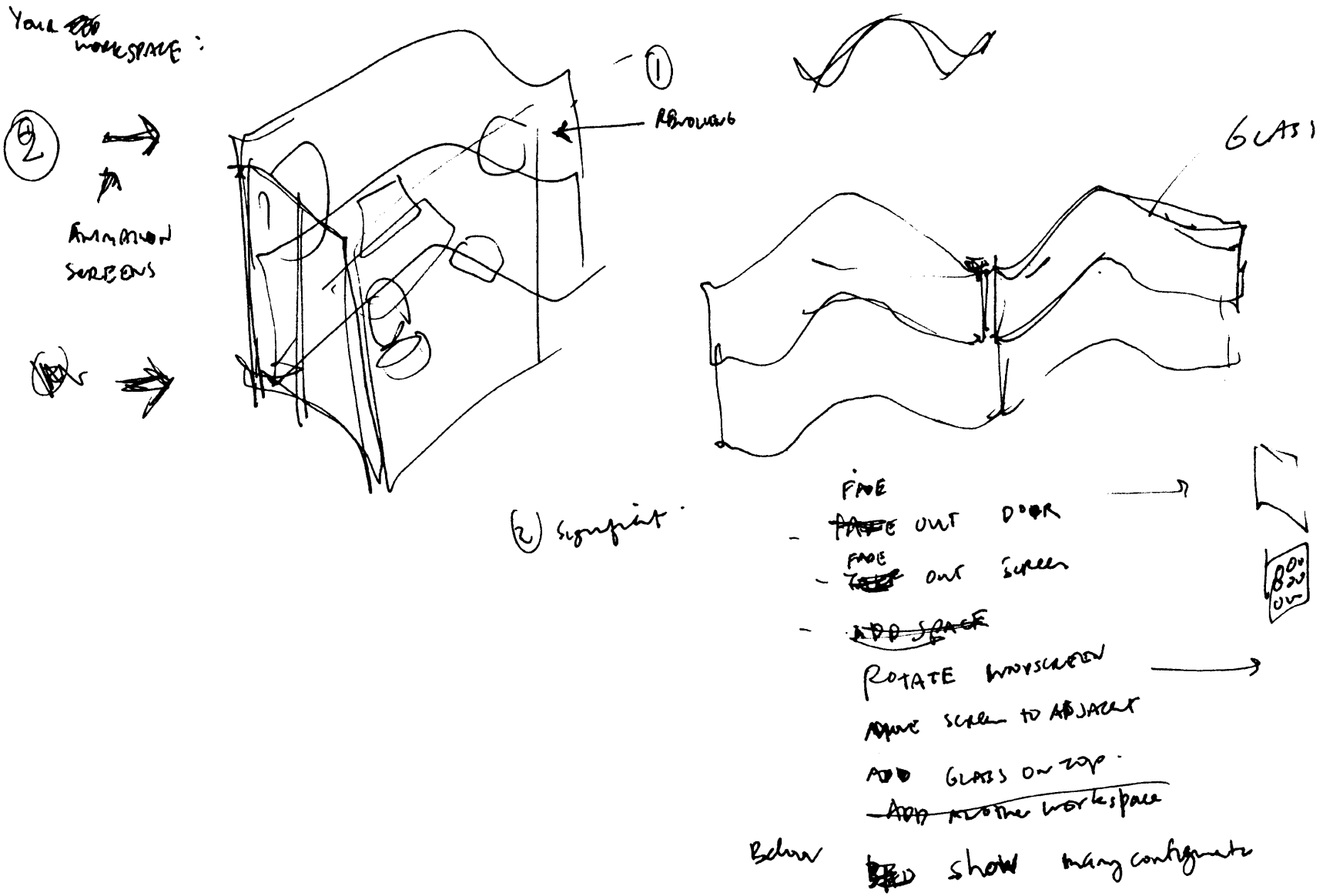


3) ONGOING COMMITMENT FOR COLLABORATION

An alternative model of working relationship is developed that rewards investment in innovation by designers and manufacturers. Techniques are established for continuous reevaluation of design interventions and results. The designer in turn can monitor the spatial organization and performance of the company and can make adjustments and improvements as new conditions occur. The interface therefore becomes a mediation device for managing more directly and efficiently the physical and communication aspects of the work environment for both the client and the designer.

The decentralized approach to office design encourages user participation. By involving users in the design process, improvements can be made towards the chances of success in office design. The very act of consulting users can lead to their greater commitment compared to conventional design approaches. Communication is the fundamental component that ties together various aspects of the design infrastructure. Through the design of a common platform, the ability for communication between the designer, the user, the organization and the manufacturer is significantly improved.




Your workspace :
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1
2) Sunspirit
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- OUT DOOR
- FADE OUT SCREEN
- ADD SPACE
ROTATE WORKSCREEN
MOVE SCREEN TO ADJACENT
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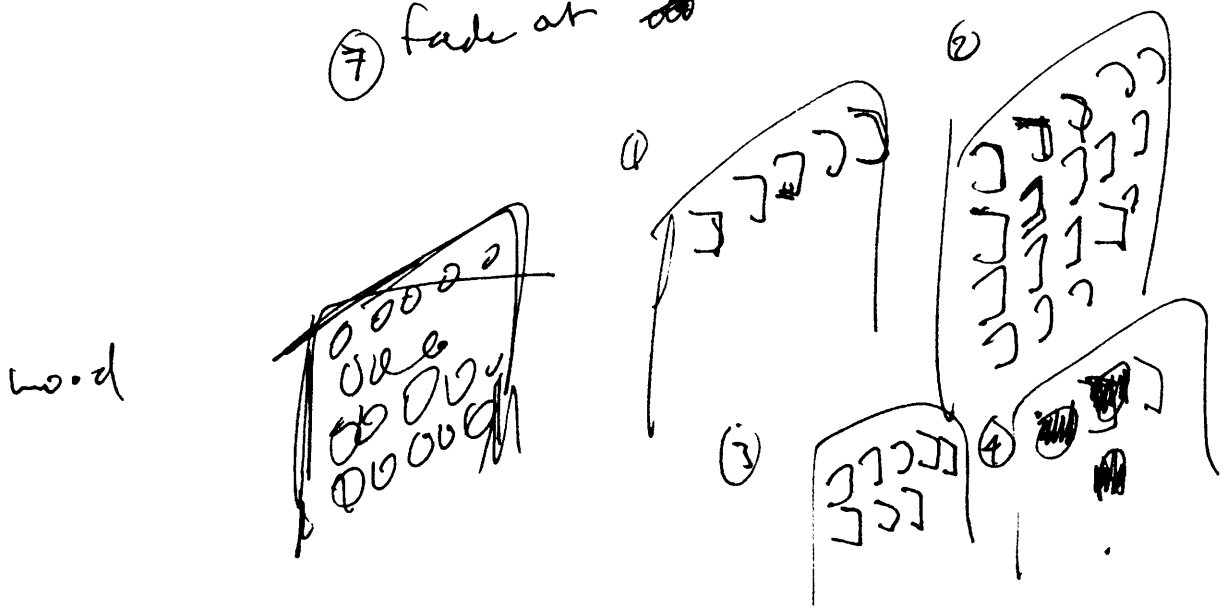

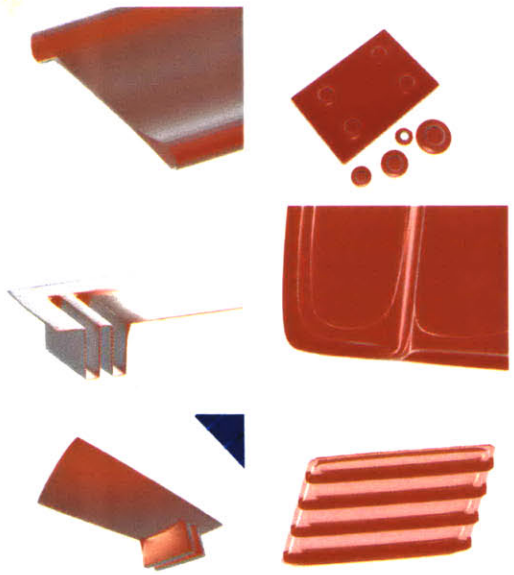

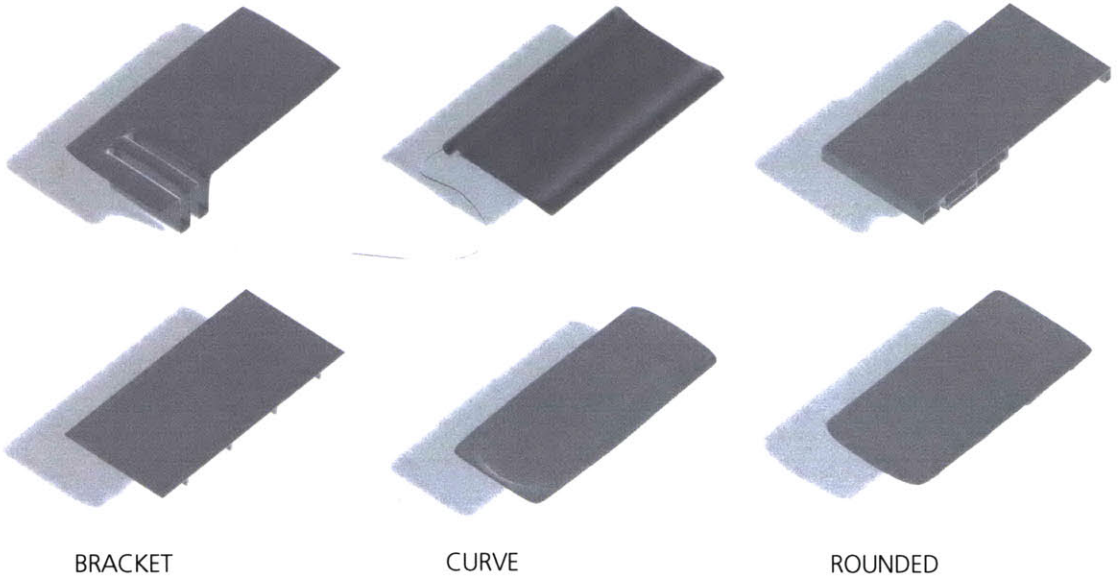
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CURVE
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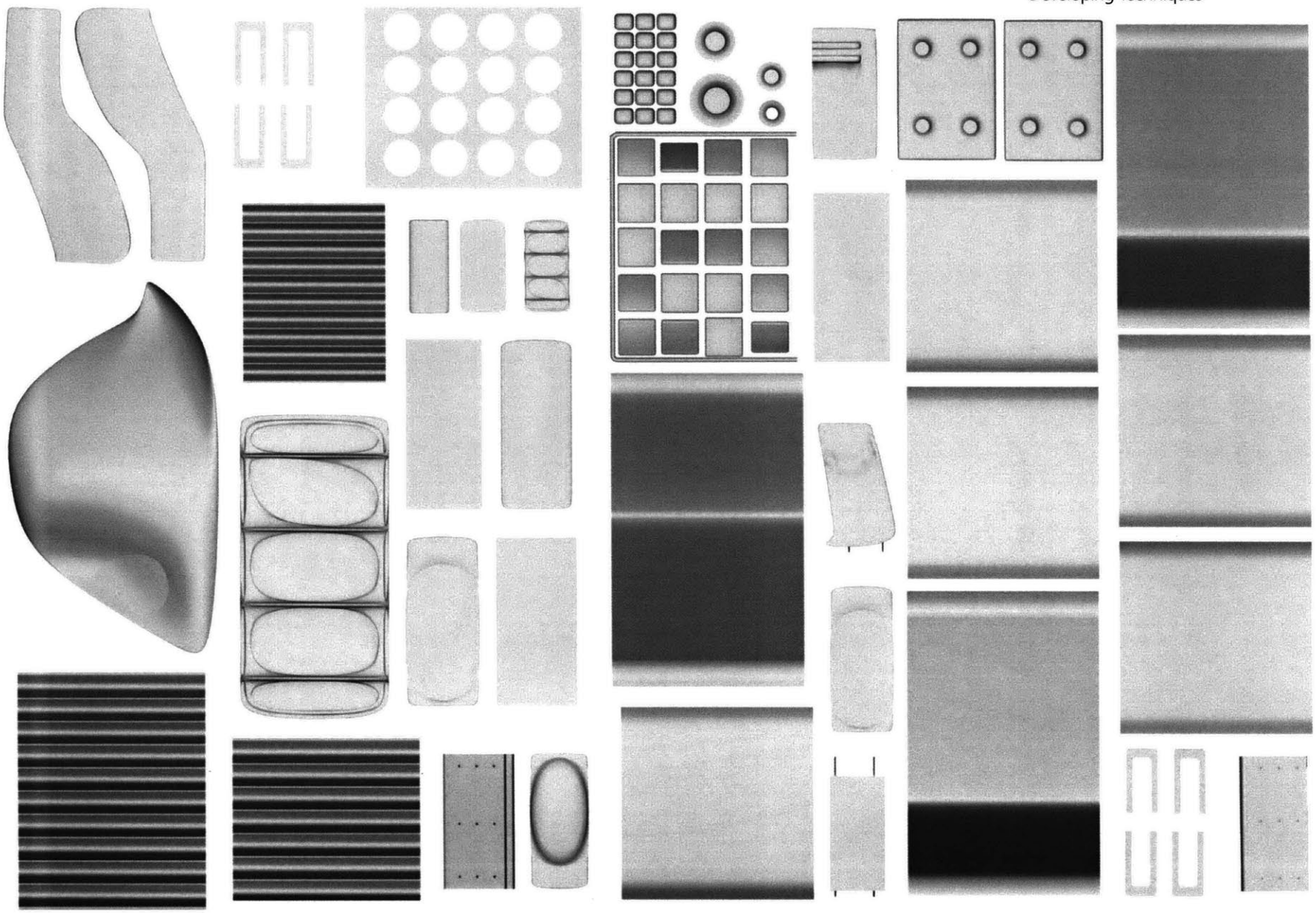

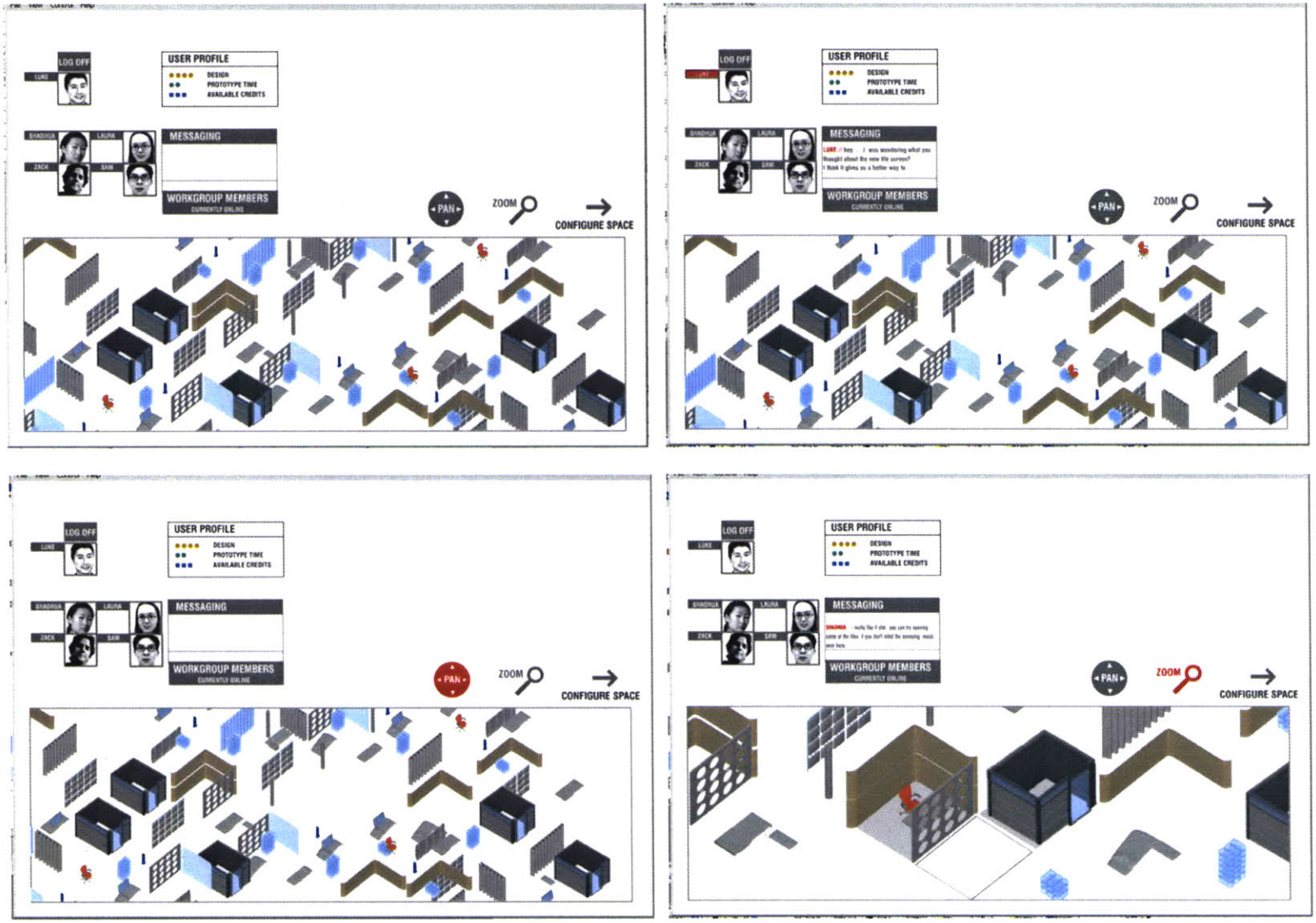
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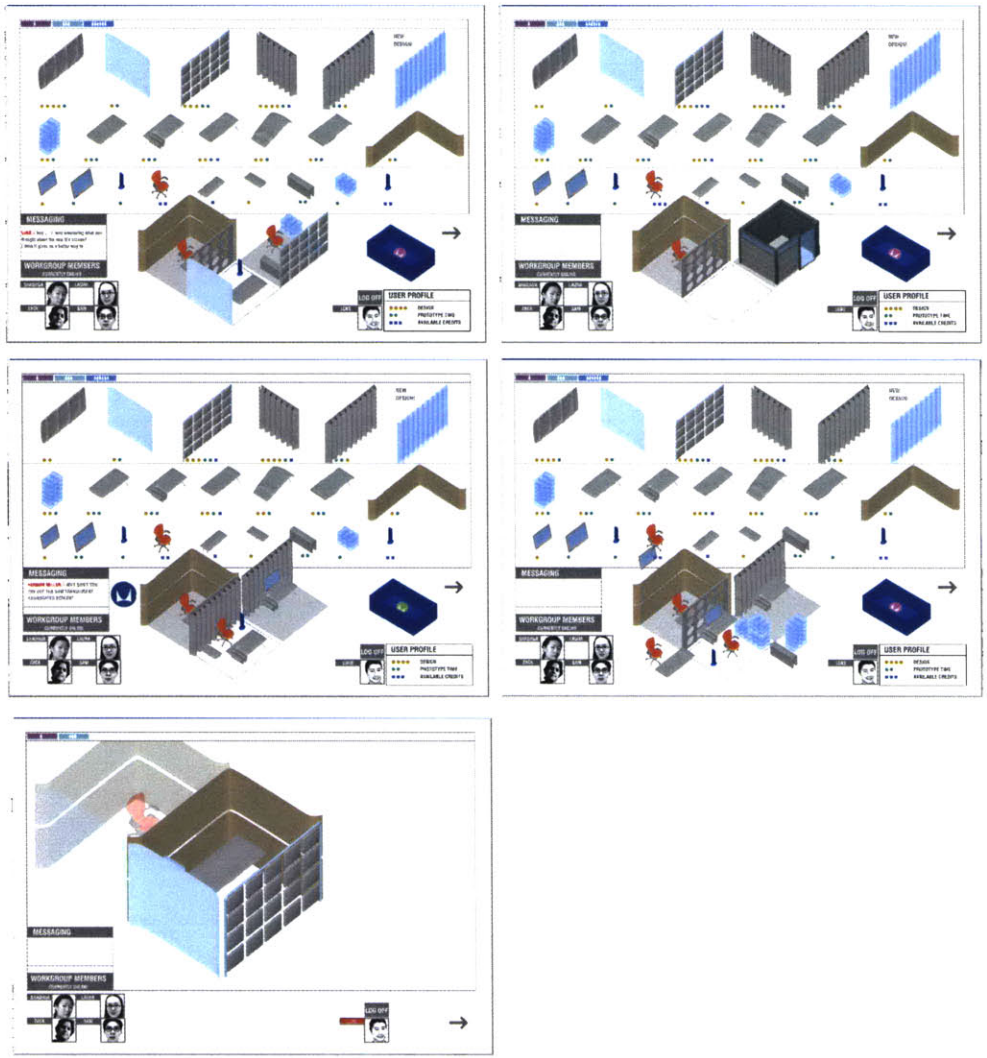
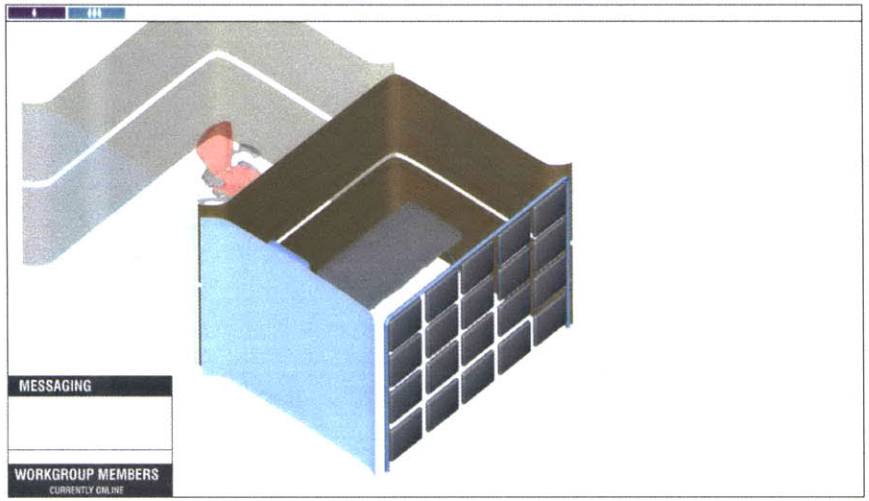
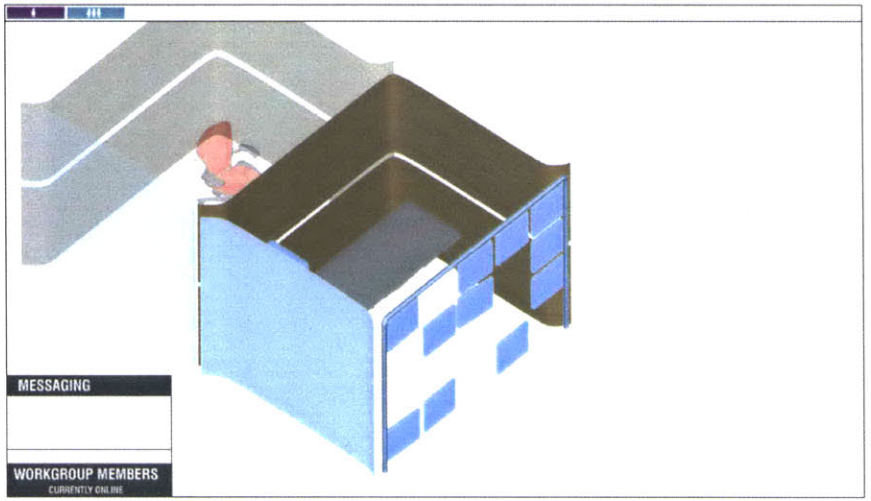
USER PROFILE
DESIGN
PROTOTYPE TIME
AVAILABLE CREDITS
MESSAGING
WORKGROUP MEMBERS
CURRENTLY ONLINE
PAN
ZOOM
CONFIGURE SPACE


MESSAGING
WORKGROUP MEMBERS
USER PROFILE
LOG OFF


MESSAGING
WORKGROUP MEMBERS
CURRENTLY ONLINE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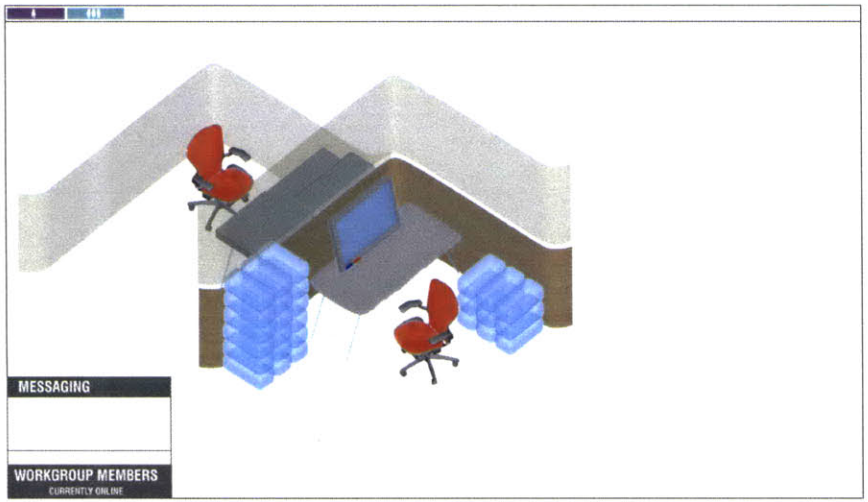
CURRENTLY ONLINE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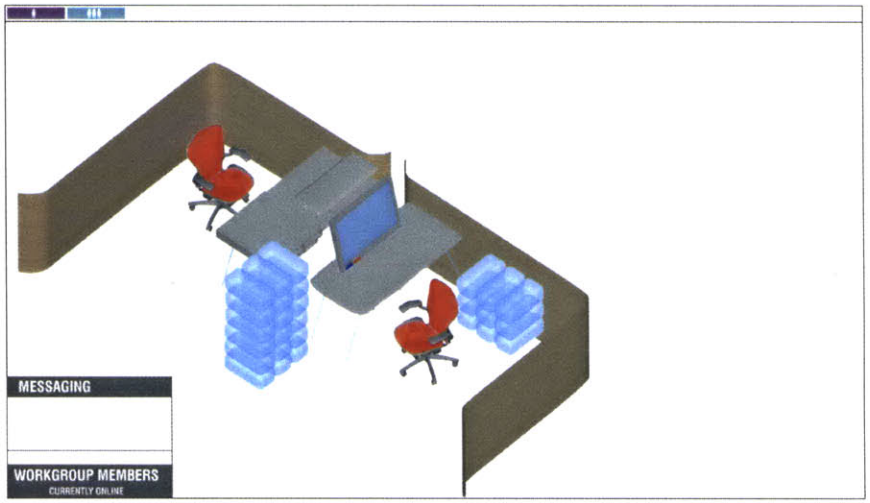
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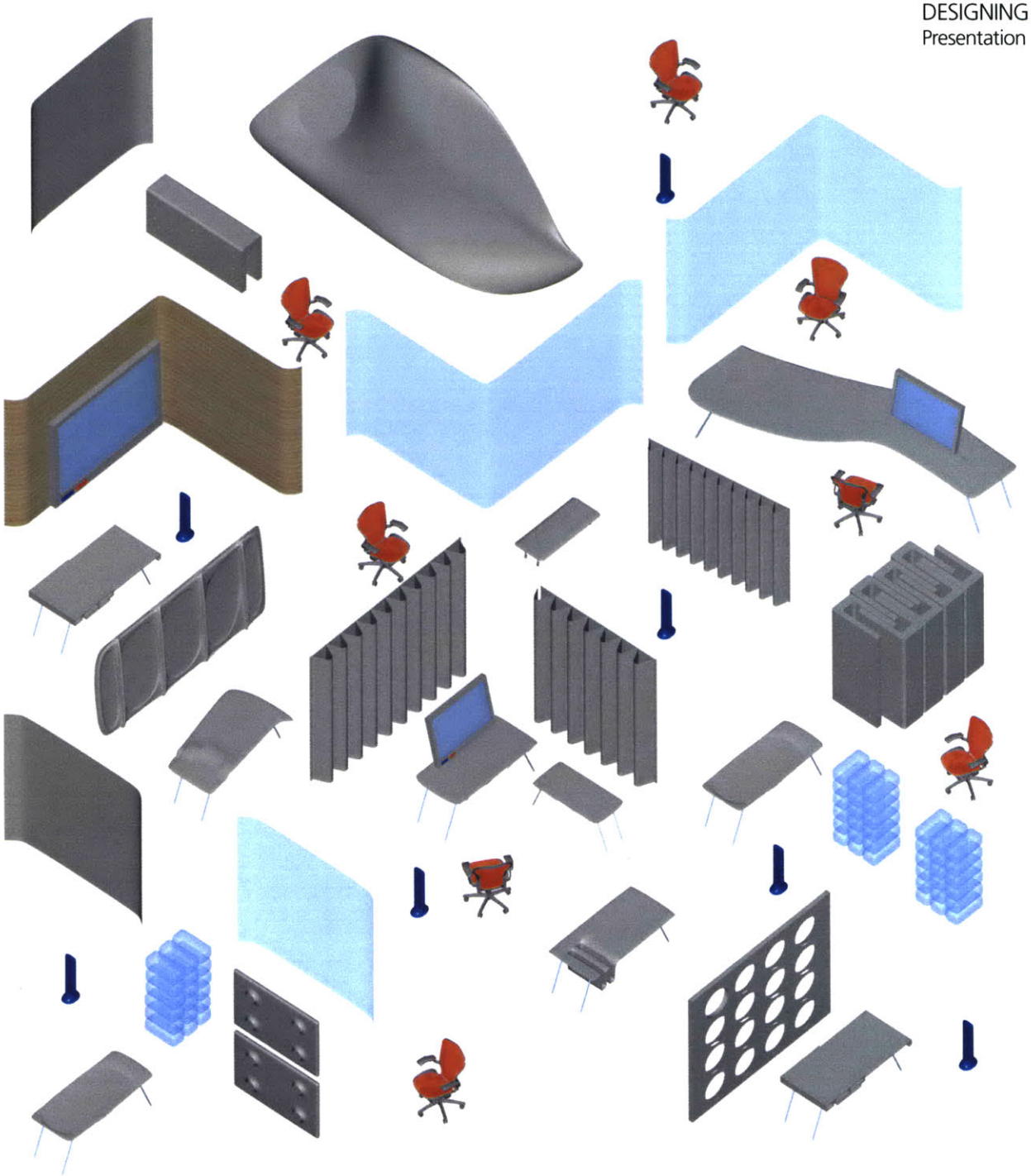
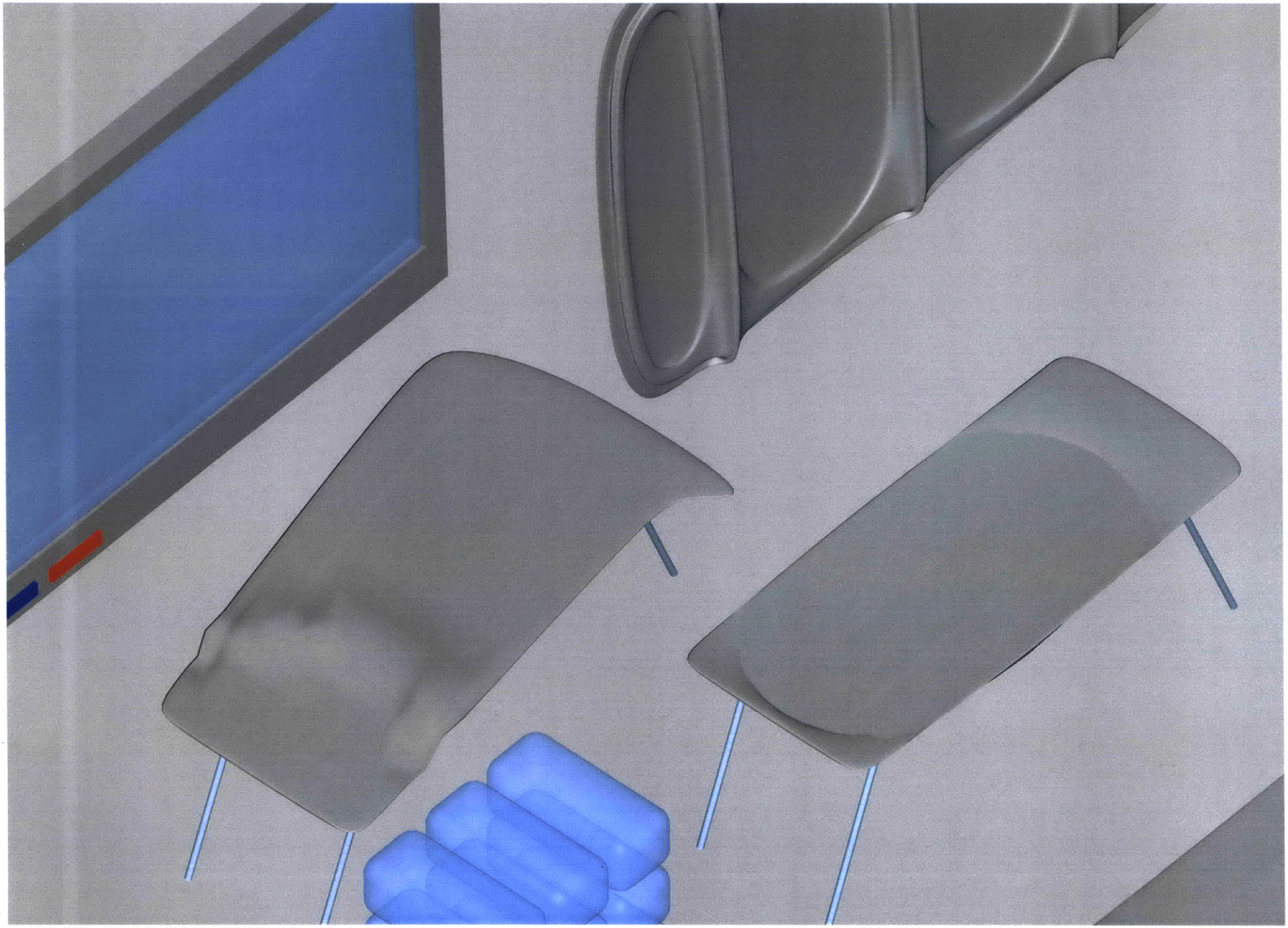


DESIGN TRANSFORMATIONS OCCUR OVER TIME.



NEW TACTILE QUALITIES ARE INTRODUCED.

CONCLUSION

Can a building promote creativity? Creativity needs an elusive dosage of order and chaos, fixity and improvisation.

Rem Koolhaas

The ideas underlying this thesis investigation were initiated in part by a personal motivation to search for more effective means of design in architectural practice. How could some of the characteristics traditionally valued in architecture - as a means to stimulate creative thought, to facilitate for social interaction, and to solve problems through collaboration - be best leveraged in today's society? The proposed design strategy attempts to address these issues in the context of the workplace and also the major changes brought about by the rapid evolution of information technology. The proposal is based on the premise that one needs to engage the user in order to effectively design for the contemporary workplace. At the same time, the development of an infrastructure for design activities acknowledges the idea that the office is a complicated intersection of conflicting and complimentary parameters and attempts to respond by providing a open-ended framework that can absorb a changing series of further meanings, extensions and intentions without entailing compromises, redundancies or contradictions.

One of the aims in developing a design infrastructure is to provide a scalable design strategy that can be implemented incrementally over time. The strategy attempts to encourage the involvement of the purchasers, the individual managers and the users themselves for the benefit of all participants. The benefits for the organization include the idea that the integrity of the corporate identity can be maintained while individual choice is being cultivated. From the project manager's perspective, the infrastructure can assist in developing informal networks that can improve the quality of the environment while maintaining formal ones for work and work related activities. From the user's perspective, new opportunities can be developed across a range of individual and collective activities, from improving communication exchanges between other users to providing the ability to design more effective work environments. And by reducing the layers of management, the design framework can bring new energy and creative collaboration to the office that can lead to a more fluid design environment minimizing provider/user barriers.

The design scenarios that are developed in the thesis attempt to demonstrate the practical value of communication in office design. Associated with this is the engagement of the digital environment to communicate and support design. The scenarios demonstrate that the integration of building data, visualization and communication to can facilitate for design decisions and representations. An important challenge in this collaborative approach is the need to develop a set of digital tools that can accommodate for uncertainties and complexities. In addition, long-term collaborative design projects require maintenance and the willingness on the part of the users to commit to using the system. The various social boundaries that exist in the multi-party collaboration need to be continuously negotiated and renegotiated. This area has been the focus of research in information systems and remote collaboration and it needs to be considered a critical issue within the architectural design community with significant potential benefit for the profession.

One beneficial aspect of the digital environment is the ability to systematically capture informational knowledge. By mediating communication thorough a computer interface, a certain level of information related to design issues of the office could be formalized. Although the primary goal of the design infrastructure was not to develop a knowledge management system or creating a knowledge repository, this capability can be extremely useful. It can further reinforce the notion of design as a relational activity that could affect larger scales of architecture, and the integration of the building and the surrounding environment.

Ultimately the principles of this architectural thesis remain rooted in the notion of empowering the user in the design of offices. The overall strategy of the design framework is to not end the design process after the initial implementation of the office layout but rather to integrate design interventions that occur throughout the life of the organization. Design is considered a constantly changing entity that is most effective in satisfying the many complex factors of the office when it is considered as a cooperative, interactive and iterative development. The thesis aims to recognize the importance of an individual within the organization and provide facilities for him or her to actively collaborate with the designer in shaping the workplace environment.

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